The New York Times

Archives | 1993

Beyond Cloning

By ROBERT POLLACK NOV. 17, 1993

The cloning of human embryos by Dr. Jerry L. Hall and his colleagues at the George Washington University Medical Center has brought us one step closer to Aldous Huxley's anti-utopian vision of mass-produced people -- the "Brave New World" in which "the whole of a small factory" was staffed with the products of a single human egg.

Dr. Hall's work was based on in vitro fertilization, in which sperm and egg are joined in the laboratory to produce a human embryo. The success of that technique (which has been pursued by thousands of couples unable to conceive in the ordinary way) produces an undeniable temptation to carry out still another technique that has proved equally successful in work with mice: the creation of embryos carrying genes produced in the laboratory.

Because the genes of all organisms are made of the same chemical -- DNA -- genes of different origins can be recombined and edited in the laboratory. Genes created in this way and inserted into a new embryo were given a name in 1980 by the

Yale biologist Frank Ruddle: transgenes. These genes will be present in every cell as the embryo grows, and they can exert their effects throughout an organism's lifetime. A proper transgene could replace a defective gene in an animal embryo, preventing the symptoms of an inherited disease.

Transgenes have been inserted into early mouse embryos for more than a decade, and from these experiments we have learned a great deal about the way genes function. Embryos no older than a few hours, and no bigger than a few dozen cells, are dislodged from a recently mated female mouse. A cell bearing a new, lab-created gene is taken from a dish and inserted through a needle into the embryo, which is then implanted in the uterus of another mouse. The progeny of the new cell become normal tissue cells, and the mixed ball of cells grows into a transgenic mouse.

Transgenic mice have been produced with human genes that function well enough to compensate for damaged or missing mouse genes. For instance, transgenic mice carrying a human hemoglobin gene produce functional hemoglobin; if the embryo comes from an inbred mouse strain suffering an inherited blood disease, its descendants are cured.

Why not transgenic people, then? There is no obvious technical barrier. The success of in vitro fertilization has shown that the early human embryo is as accessible to transgenic manipulation as any mouse embryo.

Under current regulations, this kind of manipulation of human embryonic tissue cannot be supported by Federal research grants. But no Federal law prevents such work from receiving private support.

Can there be a transgenic medicine consistent with the Hippocratic injunction to do no harm? We will have to decide fairly soon. But the questions that must be answered before we undertake such a procedure -- the ultimate in planned parenthood -- are not just matters of science.

Dr. Hall's work may lead to twins or even larger numbers of children born at different times -- early embryos can be frozen and thawed -- but it is unlikely that this advance will lead to any effort to produce a "master race"; the procedure offers no opportunity to select the inherited qualities of the cloned embryos.

Still, every new technology is imperfect. As anyone knows who has tripped over the newest model of a computer or a car, the first tries are likely to have hidden flaws. This has been true of medical technology as well: the first vaccines, the first

antibiotics and the first organ transplants all had dangerous, if temporary, side effects.

The first transgenic children, though, would be different in kind from the first volunteers to test a new gene therapy or a new drug like AZT. These volunteers are already here, and already ill; they choose the risk of a new procedure in hopes of recovery. In contrast, a transgenic mistake means a child born with an inherited defect caused by some misstep in the procedure.

Recently, for example, scientists interested in coloring the hair and eyes of an albino strain of mice injected the gene for a pigment; unexpectedly, they created a strain of mice whose viscera -- heart, stomach, liver, and the like -- were all turned around. These mice were unable to live long after birth; the added gene had inadvertently damaged a gene responsible for the usual positioning of the internal organs.

Beyond the risk of a fatal error, the accidental introduction of a more subtle mutation in a transgenic child might present us and our descendants with the task of dealing with a new inherited disease. The potential should signal a clear boundary ahead, one that religious leaders, politicians, educators and parents have as much to say about as physicians and scientists. Before we are presented with an unregulated, ill-conceived fait accompli, we all need to look carefully at this procedure and decide whether the first transgenic human embryos should be created.

Since responsible scientists cannot promise that all their first experiments will work, I do not see how transgenic medicine can ever be ethically launched. Many of my colleagues disagree, but we are unlikely to get the proper sort of public discussion of these issues unless the Government steps back in and takes notice. President Clinton has removed the ban on Federal support for fetal tissue transplant research; Congress needs to hold public hearings on the matter of transgenic babies.

A version of this op-ed appears in print on November 17, 1993, on Page A27 of the National edition with the headline: Beyond Cloning.
